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ABSTRACT

Past studies have indicated that job performance in general tends not to decline with age, but performance on at least several aptitudes does decline noticeably with age. If these relationships hold up over the entire occupational range, there is the possibility that aptitude correlations with job performance may be moderated by age. To investigate the moderating effect of age on the validity of the General Aptitude Test Battery (GATB) for five Job Family composites, validities of the aptitude composites (Cognitive, Perceptual, and Motor) and the Job Family battery for three broad age groupings were examined. The differences in validities for the three age categories were small, indicating that age differences in aptitude composite and Job Family validity and negligible. (BW)

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Is Age a Moderator of GATB Validity?

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A. Introduction

1. Aptitude-age relationship. Studies on the relationship between aptitude tests and age show that cognitive abilities decline little with age, but that perceptual and motor abilities decline substantially with age over the adult years. Figures 1, 2 and 3 show average

INSERT FIGURES 1, 2, & 3 HERE

aptitude scores for age 17-72 for Numerical Aptitude, Form Perception and Finger Dexterity. These curves are based on individuals tested with the GATB in the 1950s. Both studies included a substantial number of cases distributed throughout the age range (New York N= 1,492; four-State Study N= 2,439). Both contained controls to equalize sex and education distribution for the age intervals used. The Xs on these graphs are from the GATB research sample analyzed in the present study. It consists of 30,568 individuals included in GATB occupational validation studies conducted over a period of many years. Note that, even though no attempt was made to ensure equal male-female or equal education distribution in each age interval, the relationships are much the same as in the other two studies.

As indicated, the total validation sample available for analysis in the present study consists of 30 568 workers included in 143 test validation studies. Of these, 90 percent were done with a concurrent validation design, and 10 percent were longitudinal. The sample is half male, half female and 38 percent are minorities (including black, Hispanic, American Indian, and Asian).

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Table 1 shows the correlation between age and each of the aptitudes of the GATB, with and without years of education partialled out.

INSERT TABLE 1 HERE

These correlations are in line with the age curves which also show substantial negative relationships between age and average aptitude scores for perceptual and motor aptitudes.

2. Age-job performance relationship

Now we turn to findings on the relation of age to job performance. These findings are from the sample of 24,219 individuals whose job performance was rated on the U.S. Employment Service's standard descriptive rating scale. (This rating covers a variety of aspects of performance, including quantity, quality, job knowledge, etc.) For this sample, the correlation between years of age and the descriptive rating scale criterion was .08, which becomes -.02 when adjusted for amount of experience on the job. This means that over the range of all occupational studies, we can say that job performance tends to hold up with age.

3. The research question

At least from a superficial look at the above results on the combined occupational sample, it appears that job performance in general tends not to decline with age, but performance on at least several aptitudes does decline noticeably with age. If these relationships do indeed hold up over the entire occupational range, there is at least the possibility that aptitude correlations with job performance may be moderated by age. For example, older workers may make up for a decline in aptitude for the work by working harder or compensating in some other way to achieve satisfactory or even superior performance. If so, the aptitude - job performance correlations may be lower for older workers.

B. The Results

Table 2 shows the GATB aptitude validities for nine age groups. Note that, as in the case of the age-job performance

INSERT TABLE 2 HERE

correlation, these aptitude - job performance correlations are for all occupational validation studies combined. Thus, each validity coefficient represents the relationship between the aptitude and descriptive rating scale over a wide variety of occupations. There are 36 possible comparisons between validity coefficients for the various age intervals for each aptitude, and 324 comparisons for all nine aptitudes. Of these, only 16 were significantly different at the .05 level, exactly 5 percent. Accordingly, this overall analysis provides no basis for concluding that age is a moderator of GATB validity.

The analysis puts all jobs together for the purpose of focusing on the question of whether age is a factor in validity of prediction of job performance. Now we will look at data from the same large sample organized in perhaps a more meaningful way. Dr. John Hunter has done an analysis of GATB validities for a large number of specific occupations and concluded that five different aptitude test batteries are adequate for use in prediction of job success. These batteries apply to five families of occupations as shown in Table 3.

INSERT TABLE 3 HERE

We can now ask the question "Is age a moderator of GATB validity for the Job Family composites?" This question is directly relevant to the operational situation where these composites are used in determining relative qualifications of applicants for particular job openings.

Table 4 shows the validities of the aptitude composites

INSERT TABLE 4 HERE

(Cognitive, Perceptual, and Motor) and the Job Family battery for three broad age groupings.

Note that the concentration of data in Table 4 is in Job Families 4 and 5. Most jobs fit into these two families. As can be seen, the differences in validities for the three age categories are small. A better view of the differences that exist across all families is shown in Table 5, which weights the results for the 5 families by the number of cases on which the Table 4 validities are based.

INSERT TABLE 5 HERE

As is apparent from Table 5, age differences in aptitude composite and JOBFAM validity are negligible. Aptitude validities are comparable for older and younger workers.

Table 1

Correlation between
Age and GATB Aptitudes
(N = 30,568)

GATB Aptitudes	r age, apt.	r age, apt.ed.
G-General Learning Ability	-.16	-.06
V-Verbal Aptitude	-.10	.00
N-Numerical Aptitude	-.18	-.08
S-Spatial Aptitude	-.20	-.13
P-Form Perception	-.39	-.35
Q-Clerical Aptitude	-.24	-.20
K-Motor Coordination	-.27	-.23
F-Finger Dexterity	-.35	-.33
M-Manual Dexterity	-.29	-.26

Note: All correlations significant at .01 level, except for Age and Verbal, education constant.

Table 2
Aptitude Validities for Each Age Interval
(N = 24,219)

		Age Interval (N in Parentheses)							
	16-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55 +
Apt.	(1456)	(5576)	(5121)	(3474)	(2532)	(1941)	(1597)	(1318)	(1204)
G	.22	.25	.22	.22	.18	.20	.23	.22	.25
V	.19	.24	.18	.18	.15	.17	.17	.18	.19
N	.25	.25	.23	.22	.19	.19	.22	.19	.22
S	.10	.15	.13	.14	.14	.15	.20	.16	.21
P	.19	.20	.17	.20	.18	.19	.21	.21	.24
Q	.20	.23	.21	.21	.19	.18	.20	.17	.16
K	.12	.15	.12	.15	.15	.13	.12	.11	.11
F	.12	.14	.13	.14	.16	.13	.14	.12	.09
M	.13	.11	.11	.09	.14	.13	.14	.15	.17

Table 3

Job Family and Test Battery Composition
Contribution to Composite

<u>Job Family</u>	<u>Cognitive GNV</u>	<u>Perceptual SPQ</u>	<u>Psychomotor KFM</u>	<u>DOT Data-Things Code*</u>
1	59%	30%	11%	T=0=Setting up
2	13%		87%	T=6=Feeding-Off- bearing
3	100%			D=0=Synthesizing =1=Coordinating
4	73%		27%	D=2=Analyzing =3=Compiling =4=Computing
5	44%		56%	D=5=Copying =6=Comparing

*Refers to the 4th and 6th digit, respectively, of the Dictionary of Occupational Titles code.

Table 4

Validities of Aptitude Composites by
Job Family and Age Category* (Ns in parenthesis)

Composite	Job Family 1 Age Category			Job Family 2 Age Category			Job Family 3 Age Category			Job Family 4 Age Category			Job Family 5 Age Category		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
	(470)	(465)	(216)	(54)	(50)	(22)	(200)	(186)	(91)	(7187)	(4258)	(2209)	(4242)	(2987)	(1582)
GVN	.13	.17	.34	.10	.14	.19	.12	.37	.33	.26	.21	.24	.20	.19	.18
SPQ	.11	.16	.34	.05	.18	.07	.19	.30	.30	.20	.19	.22	.20	.21	.24
KFM	.03	.10	.17	.16	.16	.00	.08	.28	.18	.16	.15	.15	.16	.18	.18
JOBFAM	.13	.18	.36	.16	.17	.02	.12	.37	.33	.27	.22	.24	.22	.22	.22

*Category 1 Age 16-29

Category 2 Age 30-44

Category 3 Age 45-74

Table 5
Weighted Validities
for the 5 Job Families Combined

Composite	Age 16-29 (N= 12,153)	Age 30-44 (N= 7,946)	Age 45-74 (N= 4,120)
GVN	.23	.20	.22
SPQ	.20	.20	.23
KFM	.15	.16	.16
JOBFAM	.24	.22	.24

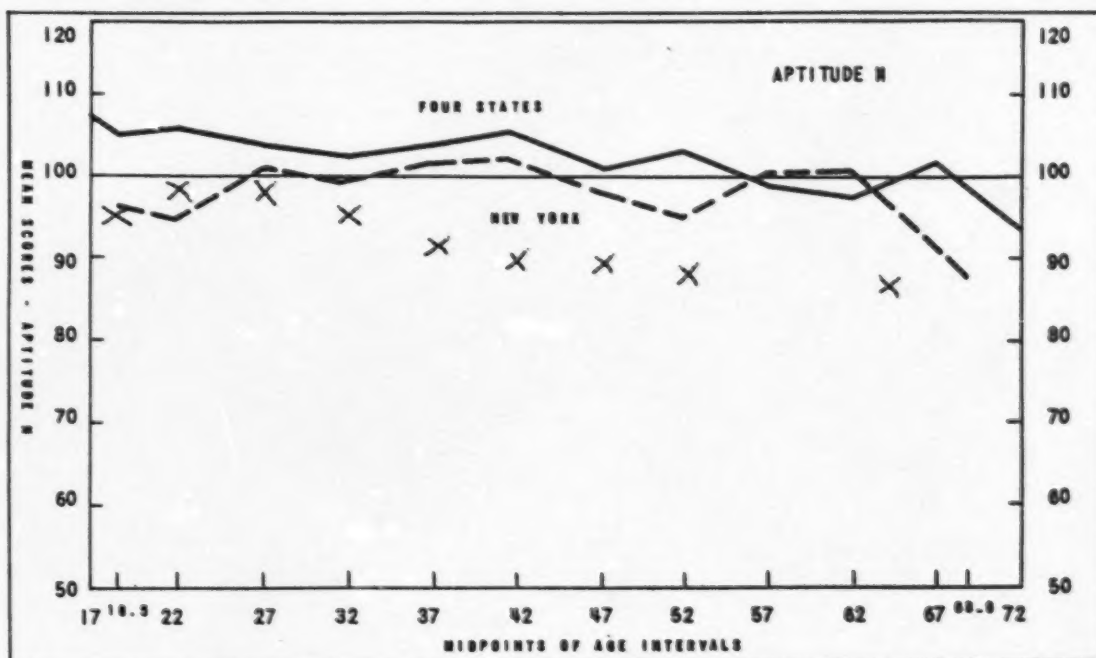


Fig. 1. Mean Numerical Aptitude scores for age groups (Xs for GATB validation sample N= 30,568)

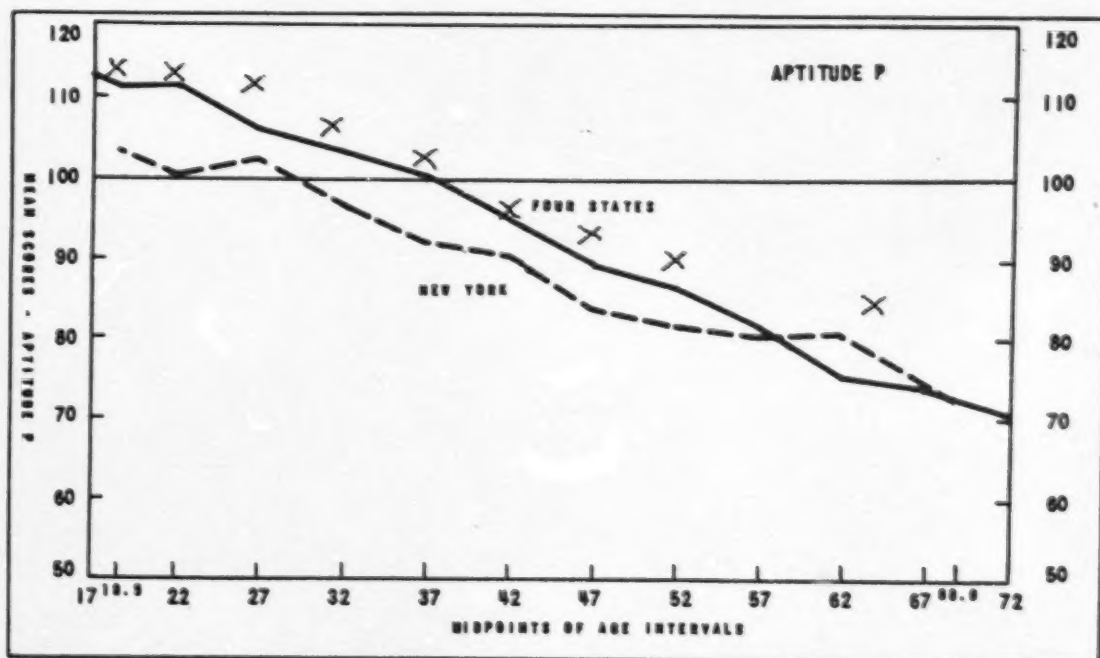


Fig. 2. Mean Form Perception scores for age groups (Xs for GATB validation sample N= 30,568)

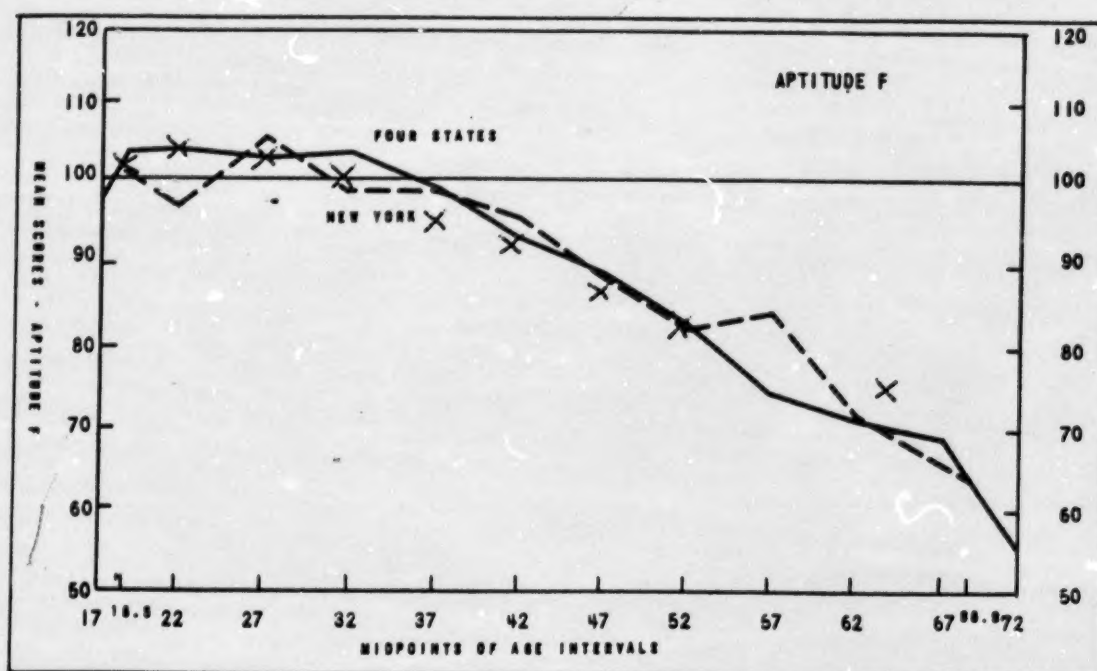


Fig. 3. Mean Finger Dexterity scores for age groups (Xs for GATB validation sample N= 30,568)